

CLAIMS

1. A recording medium on which play list information and an audio stream are recorded, wherein

5 the play list information contains main-path information and sub-path information,

the main-path information specifies one among a plurality of digital streams as a main stream and defines a main reproduction section for the main stream,

10 the sub-path information specifies another one among the plurality of digital streams as a sub stream and defines, for the sub stream, a sub reproduction section that is to be synchronized with the main reproduction section,

the main stream includes a video stream and a primary audio stream multiplexed therein,

the audio stream is specified as the sub stream and includes a plurality of packets which are each attached with a packet identifier that includes an upper field and a lower field, and

20 the upper field indicates that the audio stream is a secondary audio stream whose reproduction output is able to be mixed with a reproduction output of the primary audio stream.

2. The recording medium of Claim 1, wherein

the lower field of the packet identifier indicates a corresponding audio stream that is one among a plurality of secondary audio streams.

3. The recording medium of Claim 1, wherein

the main-path information includes a stream table that has 30 entries respectively corresponding to secondary audio streams,

each entry in the stream table has a reference value of a packet identifier corresponding to a secondary audio stream of the entry, and

5 in the stream table, the entries are arranged in an order in which the secondary audio streams respectively corresponding to the entries are selected.

4. The recording medium of Claim 1, wherein

10 each of the entries respectively corresponding to the secondary audio streams is attached with combination information that indicates a stream number of a primary audio stream whose reproduction output is able to be mixed with a reproduction output of a secondary audio stream of the entry.

15 5. The recording medium of Claim 1, wherein

each secondary audio stream includes metadata that performs a control to either increase or decrease a gain of an audio output of a primary audio stream.

20 6. The recording medium of Claim 1, wherein

the sub-path information indicates a time point at which the metadata starts to perform the control of the gain, either as a start point of the sub reproduction section or as an end point of the sub reproduction section.

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7. The recording medium of Claim 1, wherein

the sub-path information includes type information that indicates that an audio stream specified by the sub-path information itself is a secondary audio stream.

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8. A reproduction apparatus for reproducing a main stream and

a sub stream in accordance with play list information, a main reproduction section being defined for the main stream, and a sub reproduction section being defined for the sub stream,

the play list information defines a reproduction section

5 for each of a plurality of digital streams, and contains main-path information and sub-path information,

the reproduction apparatus comprising:

a first reading unit operable to read out, in accordance with the main-path information, one or more packets that constitute

10 the main reproduction section of the main stream;

a second reading unit operable to read out, in accordance with the sub-path information, one or more packets that constitute the sub reproduction section of the sub stream;

a demultiplexing unit operable to refer to upper fields of packet identifiers respectively contained in the packets read out by the first reading unit and the second reading unit, and demultiplex the packets into first packets and second packets that respectively constitute a primary audio stream and a secondary audio stream;

20 a first decoder operable to decode the first packets constituting the primary audio stream;

a second decoder operable to decode the second packets constituting the secondary audio stream; and

25 a mixing unit operable to mix decoding results, which is non-compressed digital data, of the first decoder and the second decoder.

9. The reproduction apparatus of Claim 8, wherein

the main-path information includes a stream table that has

30 entries respectively corresponding to secondary audio streams,

each entry in the stream table has a reference value of a packet identifier corresponding to a secondary audio stream of the entry,

the reproduction apparatus comprises:

5 a procedure executing unit operable to select, according to a predetermined procedure, a secondary audio stream to be reproduced, among a plurality of secondary audio streams; and

a status register operable to store a stream number of the selected secondary audio stream, wherein

10 the demultiplexing performed by the demultiplexing unit includes comparing an upper field of a reference value of a packet identifier written in an entry included in the stream table that corresponds to the stream number, and an upper field of a packet identifier of the packet read out by the second reading unit, 15 and outputting the packet constituting the secondary audio stream read out by the second reading unit to the second decoder if the comparison shows that the two upper fields match each other.

10. The reproduction apparatus of Claim 9, wherein

20 each entry is associated with combination information that indicates a stream number of a primary audio stream whose reproduction output is able to be mixed with a reproduction output of a secondary audio stream of the entry.

25 the status register stores a stream number of a currently reproduced primary audio stream,

the predetermined procedure for the procedure executing unit includes a judgment on whether or not a stream number of a primary audio stream stored in the status register matches the stream number of the primary audio stream indicated by the 30 combination information, and

the mixing unit performs the mixing if it is judged in the

predetermined procedure that the stream number of the primary audio stream stored in the status register matches the stream number of the primary audio stream indicated by the combination information.

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11. The reproduction apparatus of Claim 8, wherein the status register includes a register that stores profile information of the reproduction apparatus,

10 the profile information indicates whether or not a mixing function is mounted in the reproduction apparatus,

the mixing unit performs the mixing if the profile information indicates that the mixing function is mounted in the reproduction apparatus, and does not perform the mixing if the profile information indicates that the mixing function is not 15 mounted in the reproduction apparatus.

12. The reproduction apparatus of Claim 8 further comprising a converting unit operable to perform downmixing and/or downsampling on non-compressed digital data that is a result of 20 decoding a primary audio stream,

the mixing unit mixes an audio output of a secondary audio stream with a result of the downmixing and/or downsampling by the converting unit.

25 13. The reproduction apparatus of Claim 12, wherein each secondary audio stream includes metadata, and the converting unit performs a control to either increase or decrease a gain of an audio output of a primary audio stream, in accordance with the metadata.

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14. The reproduction apparatus of Claim 8, wherein
the sub-path information indicates a time point at which
the metadata starts to perform the control of the gain, either
as a start point of the sub reproduction section or as an end
5 point of the sub reproduction section.

15. The reproduction apparatus of Claim 8 further comprising
an auxiliary mixing unit operable to mix a click sound of
a user operation with a reproduction output of a primary audio
10 stream with which a reproduction output of a secondary audio stream
has been mixed by the mixing unit.

16. The reproduction apparatus of Claim 8 further comprising
a transmission/reception unit operable to transmit, to a
15 server apparatus, a pair of an identifier of an optical disc and
an identifier of play list information recorded on the optical
disc so that the server apparatus transmits the play list
information based on the pair of identifiers, wherein
the play list information has been received by the
20 transmission/reception unit and written to an auxiliary recording
medium.

17. The reproduction apparatus of Claim 8, wherein
when the second reading unit reads out a plurality of
25 secondary audio streams, the demultiplexing unit refers to lower
fields in addition to upper fields of packet identifiers of packets
constituting the plurality of secondary audio streams, detects,
among the packet identifiers of packets constituting the plurality
of secondary audio streams, one or more packet identifiers whose
30 upper field and lower field are predetermined values, and outputs
one or more packets that correspond to the detected one or more

packet identifiers, to the second decoder.

18. The reproduction apparatus of Claim 8, wherein
the main-path information includes a stream table that has
5 entries respectively corresponding to secondary audio streams,
each entry in the stream table has a reference value of
a packet identifier corresponding to a secondary audio stream
of the entry, and

the reproduction apparatus comprises:

10 a procedure executing unit operable to select, according
to a predetermined procedure, a secondary audio stream to be
reproduced, among a plurality of secondary audio streams; and
a status register operable to store a stream number of the
selected secondary audio stream, wherein

15 the demultiplexing performed by the demultiplexing unit
includes comparing an upper field and a lower field of a reference
value of a packet identifier written in an entry included in the
stream table that corresponds to the stream number, and an upper
field and a lower field of a packet identifier of the packet read
20 out by the second reading unit, and outputting the packet
constituting the secondary audio stream read out by the second
reading unit to the second decoder if the comparison shows that
the two upper fields match each other.

25 19. A program that causes a computer to execute a process of
reproducing a main stream and a sub stream in accordance with
play list information, a main reproduction section being defined
for the main stream, and a sub reproduction section being defined
for the sub stream,

30 the play list information defines a reproduction section
for each of a plurality of digital streams, and contains main-path

information and sub-path information,

the program comprising the steps of:

reading out, in accordance with the main-path information,

one or more packets that constitute the main reproduction section

5 of the main stream;

reading out, in accordance with the sub-path information,
one or more packets that constitute the sub reproduction section
of the sub stream;

referring to upper fields of packet identifiers respectively

10 contained in the packets read out in the packet reading steps,
and demultiplexing the packets into first packets and second
packets that respectively constitute a primary audio stream and
a secondary audio stream;

decoding the first packets constituting the primary audio
15 stream;

decoding the second packets constituting the secondary audio
stream; and

mixing decoding results, which is non-compressed digital
data, of the first decoder and the second decoder.

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20. A reproduction method of reproducing a main stream and a
sub stream in accordance with play list information, a main
reproduction section being defined for the main stream, and a
sub reproduction section being defined for the sub stream,

25 the play list information defines a reproduction section
for each of a plurality of digital streams, and contains main-path
information and sub-path information,

the reproduction method comprising the steps of:

reading out, in accordance with the main-path information,

30 one or more packets that constitute the main reproduction section

of the main stream;

reading out, in accordance with the sub-path information, one or more packets that constitute the sub reproduction section of the sub stream;

5 referring to upper fields of packet identifiers respectively contained in the packets read out in the packet reading steps, and demultiplexing the packets into first packets and second packets that respectively constitute a primary audio stream and a secondary audio stream;

10 decoding the first packets constituting the primary audio stream;

decoding the second packets constituting the secondary audio stream; and

15 mixing decoding results, which is non-compressed digital data, of the first decoder and the second decoder.